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Determinants of inflation in India

Deepak Mohanty [a,1], Joice John [b,*]

[a] Reserve Bank of India, 17th Floor, NCOB, Fort, Mumbai 400001, India
[b] Reserve Bank of India, Department of Statistics and Information Management, C8/6th Floor, Bandra-Kurla Complex, Mumbai 400051, India

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ABSTRACT

The paper attempts to identify the determinants of inflation in India in a multivariate econometric framework using quarterly data from Q1: 1996–1997 to Q3: 2013–2014. The identified determinants of domestic inflation such as crude oil prices, output gap, fiscal policy and monetary policy, and their relation with inflation is studied in a structural vector auto regression (SVAR) model. Further, the temporal changes in inflation dynamics are analyzed using a time varying parameter SVAR model with stochastic volatility. It was found that inflation dynamics in India have changed over time with various determinants showing significant time variation in the recent years, particularly after the global financial crisis.

1. Introduction

Historically, inflation in India had remained moderate. Average annual inflation rate measured by the headline Wholesale Price Index (WPI) for the 62-year period from 1950–1951 to 2012–2013 was around of 6.7 percent. In recent years, prior to the global financial crisis, from 2000–2001 to 2007–2008, average annual inflation was even lower at around 5.2 percent. However, headline inflation rose close to 10 percent during 2010–2011 and 2011–2012 before showing some decline in 2012–2013. This sudden surge in inflation and its persistence in the face of significant negative output gap was puzzling.

While stylized facts attribute the rise in inflation to both global and domestic factors, in addition to supply and demand factors, there is hardly any systematic empirical study on this aspect. This could perhaps be because of rapid changes in the drivers of inflation over a short period of time. Against this backdrop, the paper attempts to identify the determinants of inflation in India using a structural vector auto regression (SVAR) model. Further, in order to capture the temporal changes in inflation dynamics within the structural framework, a time varying parameter SVAR model with stochastic volatility is estimated. The time-varying SVAR model has been extensively used in the recent literature for examining the changes in macroeconomic dynamics and provides a flexible approach where the parameters in equations as well as the volatility are permitted to change over time (Cogley, Primiceri, & Sargent, 2010; Mumtaz & Sunder-Plassmann, 2012).

The paper is organized as follows. A brief narrative on the determinants of inflation describing the stylized facts in the Indian context is given in Section 2. Econometric framework is presented in Section 3. Section 4 presents the empirical results. Section 5 concludes.

* Corresponding author. Tel.: +91 22 26578315; fax: +91 22 26572542.
E-mail addresses: dmohanty@rbi.org.in (D. Mohanty), joicejohn@rbi.org.in (J. John).
[1] Tel.: +91 22 22633146.

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2. Determinants of inflation

Canova, Gambetti, and Pappa (2007) using a time-varying SVAR found that there are many similarities in the structural behavior of inflation and output across a number of advanced countries: in the US, changes in demand shocks were found to be most significant; in the euro area, changes in the monetary policy shocks and supply shocks were the major determinants; and in the UK, demand shocks, supply shocks and the monetary policy were important. For the emerging market economies (EME), Mohanty and Klau (2001), using the data for the 1980s and 1990s found that supply factors, including large changes in the external factors and agricultural shocks, drove domestic inflation, while traditional demand factors even though significant were relatively weak. Unsal and Osorio (2013) studying inflation dynamics in Asia showed that the contribution of monetary and supply shocks to inflation declined and domestic demand played a major role in driving inflation in the 2000s.

In this paper, global commodity prices, output gap, fiscal policy and monetary policy are examined as the key elements in the determination of inflation in India.

2.1. Global commodity prices

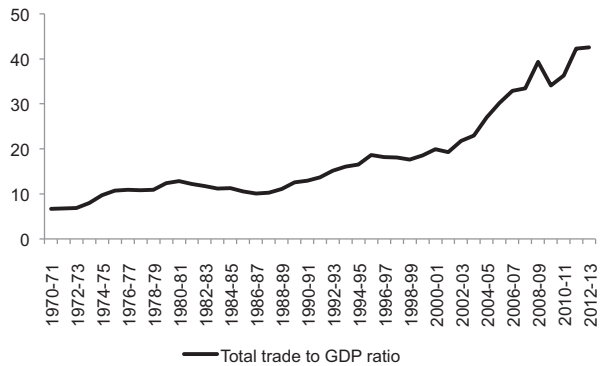
With the gradual external liberalization, the Indian economy has more opened up than ever before (Fig. 1). Hence the global commodity prices and the exchange rate are playing increasingly important role in the determination of inflation. Currently, near about 80 percent of crude oil demand in India is met by imports. During 2009–2011, global commodity prices had an adverse impact on domestic inflation. In 2012, the depreciation of the Indian Rupee more than offset the beneficial impact of marginal decline in global commodity prices on domestic inflation (Fig. 2) (RBI, 2013). Further, some studies on exchange rate pass through to domestic prices in the Indian context suggest that 100 basis points (bps) change in the exchange rate had around 10 bps impact on inflation (Bhattacharya, Patnaik, & Shah, 2008; Khundrakpam, 2008; Kapur & Behera, 2012).

2.2. Output gap

Traditional empirical work on the Phillips curve had tended to focus on the output gap as a key indicator of inflationary pressures. The evidence on Phillips-curve relationship in India is mixed. A number of studies covering data up to the 1990s or earlier did not find the conventional Phillips-curve pattern (Bhalla, 1981; Bhattacharya & Lodh, 1990; Chatterji, 1989; Dholakia, 1990; Samanta, 1986; Virmani, 2004). However, Coe and McDermott (2013) found that the output gap is an important determinant of inflation in almost all the Asian economies including India. Further, Paul (2009) found that, in India, after controlling for certain supply shocks, it is likely to have the short-run tradeoff between inflation and industrial output.

2.3. Fiscal policy

Theoretical explanations of the fiscal impact of inflation are well postulated in the macroeconomic theory. As argued by Sargent and Wallace (1981), there is a dynamic relationship between fiscal deficit and inflation. Since borrowing programs usually allow governments to allocate 'seigniorage' over a period of time, the relationship between fiscal deficit and inflation



Based on authors' calculations using data on 'India's foreign trade' and 'GDP at current market prices' (Source: Database on Indian Economy, Reserve Bank of India)

Fig. 1. Total trade to GDP ratio.